

REMARKS

Claims 1-8, 11 and 13-16 are pending. Claims 9, 10 and 12 are canceled. Claims 1 and 16 are amended.

Claims 9, 10, 12 and 16 stand rejected under 35 USC 112, second paragraph. This rejection is rendered moot by canceling claims 9, 10 and 12 and amending claim 16 according to the Examiner's suggestion.

Claims 1-3 and 6-16 stand rejected under 35 USC 103(a) over Applicant's Admitted Prior Art (hereinafter, "AAPA") in view of Hopper (U.S. Patent No. 6,030,901). Applicant respectfully traverses this rejection.

The invention of Hopper relates to a method for stripping photoresist from a carbon--containing polymer layer. The principal problem solved by Hopper is to enable the removal of a photoresist mask without increasing the dielectric constant. A secondary problem is to avoid the removal of carbon-containing polymer materials during such stripping (see col. 3, line 42-43).

By contrast, the method of applicant's invention, as recited in claim 1, relates to the removal of a photoresist from a liner on a hard mask constituted mostly of carbon (see amended claim 1). A principal difference between Hopper and applicant's invention lies in the material on which the photoresist to be removed is formed. In Hopper, the underlying material is a carbon-containing polymer (see col. 5, line 16 and 17) serving as an inter-layer dielectric such as benzocyclobutene (BZB) or methyl silsesquioxane (MSQ, see col. 2, lines 53-55, and claims 2 and 5). The carbon-content in Hopper is given through the polymer, which has a back bone containing carbon (see claim 4). However, there is no disclosure or suggestion in Hopper that the carbon content in the ILD-layer exceeds that of the polymer. The purpose of the ILD-layer in Hopper is to serve as a dielectric layer with a low dielectric constant.

By contrast, in accordance with applicant's invention, the layer underlying the photoresist is a hard mask constituted mostly of carbon. In addition, an SiON liner is formed on this carbon hard mask. The purpose of the hard mask and the liner is to serve as an etch mask for subsequent structuring steps. This structuring method using a carbon hard mask stack can be applied in principle at all structuring levels where material compatibility is feasible. This affords a way to structure at resolutions below the current lithographic limits.

Thus, the purpose as well as the chemical constitution of the layers underlying the photoresist layer to be stripped in the present invention is entirely different from that of Hopper. Also the problem solved by the present invention, preventing degradation of an underlying carbon hard mask, is entirely different from the problems solved by Hopper, preventing an increase of a dielectric constant and removal of a polymer layer. Furthermore, the selectivity of an etchant depends entirely on the chemistry of the materials involved. The photoresist in Hopper is stripped from a polymer material, but this can give no indication regarding the etchant's selectivity to SiON or its ability to leave an underlying carbon hard mask intact.

While AAPA may disclose the removal of a photoresist from a liner on a hard mask constituted mostly of carbon, no motivation is provided that would lead one of ordinary skill in the art to combine AAPA with Hopper to arrive at applicant's invention, nor has the Examiner cited or provided such a motivation other than to assert it would render applicant's invention obvious. As detailed above, AAPA and Hopper are applicable to two very different processes involving semiconductor manufacture and there is no motivation to combine them to achieve applicant's invention as recited in the claims.

Claims 4 and 5 stand rejected under 35 USC 103(a) over AAPA in view of Hopper and in further view of Waldfried (U.S. Patent No. 6,630,406). Applicant respectfully traverses this rejection. Waldfried does not address the deficiencies noted above with respect to claim 1, nor has


the Examiner cited Waldfried for this purpose. Therefore, claims 4 and 5, which depend from claim 1, are also allowable.

Claims 1-8, 11 and 13-16 depend from allowable claim 1 and are therefore also allowable. Accordingly, applicant solicits an early action allowing all of the pending claims.

In the event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, Applicants petition for any required Relief, including extensions of time, and authorize the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing **543822003300**.

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Respectfully submitted,

By 
Adam Keser
Registration No. 54,217
MORRISON & FOERSTER LLP
1650 Tysons Blvd, Suite 300
McLean, Virginia 22102
(703) 760-7301 – Telephone
(703) 760-7777 – Facsimile